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# Return to work following sickness absence due to infectious mononucleosis

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<b>Background</b>	Epstein–Barr virus infectious mononucleosis among adults is notorious because of the prolonged incapacitating fatigue it causes.
<b>Aims</b>	To investigate the duration of sickness absence and return to work following infectious mononucleosis.
<b>Methods</b>	Episodes of sickness absence due to infectious mononucleosis were selected from an occupational health services register. The duration of sickness absence and return to work was assessed with Kaplan–Meier survival analysis.
<b>Results</b>	Two thousand one hundred and thirty-seven episodes of absence due to infectious mononucleosis had a median duration of 91 days. Young employees (aged 15–24 years) had the highest return to work rates. Women had longer sickness absence than men. Employees working in small companies were absent longer than employees in large companies.
<b>Conclusions</b>	Occupational physicians should advise gradual return to work, starting 4 weeks after the onset of the illness, in order to prevent physical deconditioning and prolonged illness.
<b>Key words</b>	Age differences; Epstein–Barr virus; gender differences; infectious mononucleosis; sick leave; sickness absence; return to work.

## Introduction

The Epstein–Barr virus is highly prevalent in adults all over the world and spreads through intimate oral contact. In Asia and the developing countries, children are infected in the first years of their life, while primary infection is delayed in most developed countries [1]. In The Netherlands, 50% of children >5 years of age and 90% of adults are reported to have had a subclinical infection [2]. Symptomatic primary Epstein–Barr virus infection is more commonly known as infectious mononucleosis. It is an illness that afflicts adolescents and young adults, as a febrile illness accompanied by pharyngitis and lymphadenopathy [3].

Infectious mononucleosis should be suspected in patients of 10–30 years of age who present with a sore throat and severe fatigue. Mild neutrophil leucocytosis is often present in the first few days, subsequently replaced by characteristic mononuclear T-lymphocytes [4]. Positive

antibody titres are found in the serum in >80% of cases after 1 week, and they remain positive for weeks. Infectious mononucleosis is a self-limiting disease, but occasionally, it is complicated by a variety of acute neurologic, haematological, hepatic, splenic, respiratory and/or psychological complications [5,6].

More commonly, adults suffer from a distinct chronic syndrome of fatigue, myalgia and need for sleep, which may persist for several months after the acute infection has resolved. Adults of working age, with clinically manifest infectious mononucleosis, usually report sick because of the incapacitating fatigue, which limits their daily and social activities. These symptoms are usually thought to have a long duration (of months or even a year), confirming the belief that it is necessary to be absent from work for a long time. However, it has been reported that poor physical functioning and less activity during convalescence predict a prolonged state of the illness [7].

Little is known about the sickness absence and return to work of employees with clinically manifest Epstein–Barr virus infectious mononucleosis. Therefore, in this study, we investigated the following:

- i) the median duration of sickness absence due to infectious mononucleosis,
- ii) sociodemographic differences in the duration of sickness absence due to infectious mononucleosis and
- iii) the course of return to work following infectious mononucleosis.

## Methods

ArboNed Occupational Health Services registers the sickness absence data of an average of 1 million Dutch employees working in a variety of companies and economic sectors that are representative of the Dutch labour market. In The Netherlands, employees report sick to their employer, who pays sickness benefits. The Dutch sickness absence legislation requires medical certification of sickness by an occupational physician within the first 5 weeks of sickness absence. The occupational physician enquires about the sickness and documents the information in the employee's medical file, together with a diagnosis based on codes of the International Classification of Diseases (ICD) [8]. Occupational physicians use the ICD-10 code B27 for sickness absence due to serologically verified infectious mononucleosis. We analysed all sickness absence episodes that were diagnosed as infectious mononucleosis between January 2004 and June 2007. Return to work can be partial or full. The period between the first day of sickness absence and return to work to  $\geq 50\%$  of contracted hours was regarded as the time until partial return to work and the period between the first day of sickness absence and return to work to 100% of contracted hours was defined as the time until full return to work.

The age of the employees was registered at the moment when they reported sick, and four age groups were used (15–24 years, 25–34 years, 35–44 years and 45–64 years).

Socio-economic status was determined according to the postal code of the employee's home address. The postal codes were linked to a status score on The Netherlands Institute for Social Research tables, in which all postal codes in The Netherlands are ranked on a scale from 1 to 4000, with 1 indicating the richest neighbourhood and 4000 the poorest. For this study, we computed three tertiles of these status scores, distinguishing between high, medium and low socio-economic status. The companies in which the employees worked were subdivided into four size categories: employing <75 employees, 75–499 employees, 500–4999 employees and  $\geq 5000$  employees.

The data were analysed in SPSS for Windows, version 15. Kaplan–Meier survival curves were computed to cal-

culate the median duration of sickness absence. When estimating the duration of episodes of sickness absence, it is important to censor absences which have not ended before the end of the observation period or the dismissal date [9] because we know that the date of recovery, if any, is later than that date, but we do not know how much later. Therefore, we censored absences that did not end before 1 June 2007 (the end of the observation period) or which ended in dismissal. A censored episode contributes to the duration of sickness absence but implies that there was no recovery. Cox regression analysis was performed to investigate the influence of the covariates on the duration until return to work. Firstly, we analysed the duration until partial return to work and secondly, the duration until full return to work.

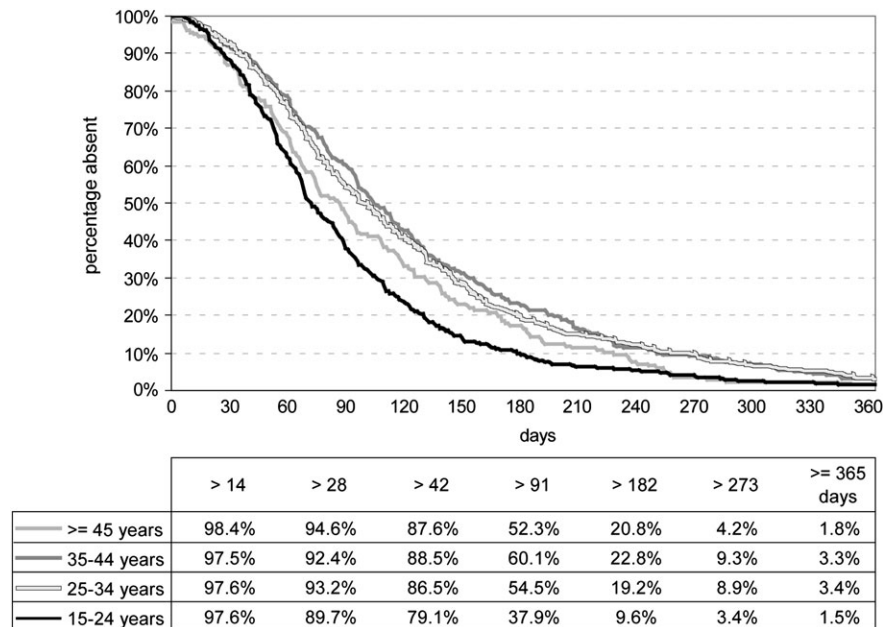
No approval from a medical ethics committee, or informed consent, was required because the registered data were analysed anonymously at group level.

## Results

Between January 2004 and June 2007, we counted 2137 episodes of sickness absence certified as infectious mononucleosis: 1069 in men and 1068 in women. The mean age of the men was 30.9 (SD = 9.5) years, and for the women, it was 30.5 (SD = 9.7) years. One hundred and sixty episodes (15%) in the men and 201 episodes (19%) in the women lasted for at least 6 months, and after 1 year, 20 men (2%) and 32 women (3%) were still absent from work. Figure 1 shows that men and women in the age group 15–24 years had a shorter duration of sickness absence duration than employees in the older age groups (logrank test: men  $P < 0.001$  and women  $P < 0.001$ ).

The duration of sickness absence had a positively skewed distribution. Therefore, the median is preferred as a central measure. The median duration of sickness absence was 91 days (95% CI = 87–95 days) and was shorter for men (median 86 days; 95% CI = 82–90 days) than for women (median 98 days; 95% CI = 92–104 days) ( $P < 0.001$ ), as is shown in Table 1.

Table 2 shows the course of sickness absence due to infectious mononucleosis from the start of the episode until the end of the observation period. The median duration until partial or full return to work in those who did return to work was 45 days (95% CI = 42–49 days) and did not differ according to gender: 46 days (95% CI = 42–49 days) for men and 44 days (95% CI = 40–49 days) for women. The mean duration until partial or full return to work was significantly ( $P < 0.05$ ) longer for women >45 years than for younger women, while for men, the median time until return to work did not differ significantly between the age groups. Socio-economic status was not associated with the duration until return to work. Employees working in the largest companies returned to work earlier than those working in the smaller companies ( $P < 0.05$ ).



**Figure 1.** Full return to work following Epstein–Barr virus infectious mononucleosis according to age.

**Table 1.** The median duration (95% CI) of sickness absence due to infectious mononucleosis in men and women according to age, socio-economic status and company size

	Number of sickness absences			Median duration of sickness absence in days (95% CI)		
	Men	Women	Total	Men	Women	Total
Age (years)						
15–24	358	385	743	70 (65–75)	85 (74–96)	73 (68–78)
25–34	363	392	755	91 (83–99)	110 (98–122)	102 (95–109)
35–44	255	195	450	104 (94–114)	107 (89–125)	106 (98–114)
≥45	91	95	186	91 (71–111)	102 (72–132)	102 (90–114)
Socio-economic status						
High	352	352	704	83 (75–91)	97 (89–105)	90 (84–96)
Medium	352	355	707	91 (83–99)	98 (87–109)	95 (88–102)
Low	353	351	704	82 (76–88)	105 (94–116)	91 (86–96)
Company size						
<75 employees	372	334	706	91 (84–98)	112 (102–122)	100 (93–107)
75–499 employees	275	270	545	96 (84–108)	97 (86–108)	97 (89–105)
500–4999 employees	293	349	642	81 (74–88)	98 (87–109)	89 (83–95)
≥5000 employees	121	109	230	65 (59–71)	70 (57–83)	68 (63–73)
Total	1069	1068	2137	86 (82–90)	98 (92–104)	91 (87–95)

Men and women <25 years of age more often recovered without partial return to work compared with employees in the older age groups (logrank test: men  $P < 0.001$  and women  $P < 0.001$ ). Employees in the age groups of 25–34 years [hazard rate (HR) = 1.39; 95% CI = 1.21–1.59] and 35–44 years (HR = 1.30; 95% CI = 1.11–1.52) partially returned to work significantly earlier than employees in the age group of 15–24 years but took longer until full return to work (HR = 0.65; 95% CI = 0.59–0.73 and HR = 0.61; 95% CI = 0.53–0.69, respectively), as is shown in Table 3.

For 1906 employees, we were able to count the number of days of sickness absence in the year before sickness absence due to infectious mononucleosis, and we compared this number with the number of days of sickness absence during 12 months after full return to work. The average number of sickness absence days in the previous year was 13.4 (SD = 26.7). This did not differ using the paired  $t$ -test on the log-transformed number of days of sickness absence from the number of days of sickness absence 1 year after full return to work (mean = 12.5 days; SD = 29.7 days).

**Table 2.** Partial return to work according to gender, age, socio-economic status and company size

	No or <50% partial return to work, <i>n</i> (%)	Partial return to work <sup>a</sup> , <i>n</i> (%)	Recovered without partial return to work, <i>n</i> (%)	Total, <i>n</i>
Men 15–24 years	42 (12)	146 (41)	170 (48)	358
Men 25–34 years	33 (9)	224 (62)	106 (29)	363
Men 35–44 years	15 (6)	181 (71)	59 (23)	255
Men ≥ 45 years	2 (2)	58 (64)	31 (34)	91
Women 15–24 years	49 (13)	189 (49)	147 (38)	385
Women 25–34 years	36 (9)	290 (74)	66 (17)	392
Women 35–44 years	27 (14)	120 (62)	48 (25)	195
Women ≥ 45 years	3 (3)	59 (62)	33 (35)	95
Company size				
<75 employees	100 (14)	379 (54)	227 (32)	706
75–499 employees	39 (7)	374 (69)	132 (24)	545
500–4999 employees	44 (7)	386 (60)	212 (33)	642
≥5000 employees	22 (10)	123 (54)	85 (37)	230
Socio-economic status				
High	70 (10)	434 (62)	200 (28)	704
Medium	74 (11)	410 (58)	223 (32)	707
Low	61 (9)	413 (59)	230 (33)	704
Total	208 (10)	1268 (59)	661 (31)	2137

<sup>a</sup>Partial return to work = return to work to ≥50% of contracted hours.

**Table 3.** Cox regression of duration until partial and full return to work

	Partial return to work <sup>a</sup>	Full return to work
	HR (95% CI)	HR (95% CI)
Men (reference)	1.00	1.00
Women	1.04 (0.93–1.16)	0.81 (0.74–0.89)**
Age		
15–24 years (reference)	1.00	1.00
25–34 years	1.39 (1.21–1.59)**	0.65 (0.59–0.73)**
35–44 years	1.30 (1.11–1.52)**	0.61 (0.53–0.69)**
≥45 years	1.12 (0.90–1.39)	0.68 (0.58–0.81)**
Company size		
<75 employees (reference)	1.00	1.00
75–499 employees	1.45 (1.25–1.67)**	1.18 (1.04–1.33)**
500–4999 employees	1.29 (1.12–1.49)**	1.20 (1.07–1.34)**
≥5000 employees	1.31 (1.07–1.61)**	1.51 (1.28–1.77)**
Socio-economic status		
High	1.02 (0.89–1.17)	1.01 (0.91–1.13)
Medium	0.91 (0.79–1.04)	0.92 (0.82–1.03)
Low (reference)	1.00	1.00

The table shows HR and their 95% CI. A HR >1 indicates a shorter duration until (partial) return to work, whereas a HR <1 reflects a longer duration; \**P* < 0.05 and \*\**P* < 0.01.

<sup>a</sup>Partial return to work = return to work to ≥50% of contracted hours.

## Discussion

The median duration of sickness absence due to infectious mononucleosis was 91 days and was longer for women (98 days) than for men (86 days). The rates of return to work were highest for young employees and for employees working in large companies. It seems likely

that in large companies, there are more opportunities to adjust the workload and the work tempo to the level of physical functioning, in consultation with the supervisor and colleagues. The number of sickness absence days in the year before infectious mononucleosis did not differ significantly from the number of days of sickness absence in the year after return to work, suggesting that employees



return to normal working capacity after full return to work.

For this study, we selected sickness absence episodes certified as infectious mononucleosis by an occupational physician. The diagnostic codes documented by the occupational physicians were based on serologically verified infectious mononucleosis, implying that the diagnoses had a high specificity. This may have over-estimated the duration of sickness absence because patients with mild-to-moderate malaise and fever may remain unrecognized in primary care or they sometimes continue to work despite their moderate illness. We had no knowledge about comorbidity or whether complications occurred over time. Psychiatric disorders, and especially mood disorders, are prevalent in patients suffering infectious mononucleosis, particularly in the first 6 months of the illness [10,11].

Epstein–Barr virus infectious mononucleosis has a different course in adults than in adolescents. Adults mainly suffer from a fever, often with liver abnormalities [12], and delayed convalescence is not uncommon. Buchwald *et al.* [13] reported that 12% of adults failed to recover 6 months after acute glandular fever. White *et al.* [10] reported that 40% of patients with infectious mononucleosis were still severely fatigued after 6 months and 22% suffered hypersomnia. Our results showed that ~50% of the employees returned to work 3 months after the diagnosis and 80% returned to work after 6 months. Sickness absence lasted for >1 year in 2–3% of the adults. Lambore *et al.* [14] found that 6% of adults with chronic symptoms of infectious mononucleosis reported that their tiredness and daytime sleepiness persisted for >1 year.

Earlier research has shown that rest is the most common advice given by general practitioners to patients with infectious mononucleosis [15]. However, poor physical functioning plays a key role in causing prolonged symptoms following acute infectious mononucleosis. Candy *et al.* [7] reported that restriction of activities in the acute phase is associated with a poorer outcome, in terms of longer work incapacity. In the literature, gradual return to competition is recommended for sportsmen with no spleen enlargement 4 weeks after the onset of illness [16,17]. In occupational medicine practice, abdominal ultrasound scanning is often not available to demonstrate hepatomegaly or splenomegaly; however, these complications mostly appear in the first 4 weeks of illness [16]. Therefore, it should be feasible for employees to gradually return to work 4 weeks after the onset of sickness absence due to infectious mononucleosis. However, our results show that return to work takes almost twice as long because the median duration until partial or full return to work was 45 days (95% CI = 42–49 days) for those who did return to work.

The World Health Organization International Classification of Functioning, Disability, and Health explains how disease and disability are related [18]. Diseases or disorders affect body structure and function, impair activ-

ities and restrict participation. Whether or not this leads to disability depends on conditional factors of environmental origin (such as workload) and of personal origin (such as personal ideas about the illness). In assisting a patient to recover from infectious mononucleosis, the occupational physician has three opportunities to stimulate return to work. The first opportunity is to include daily activities and return to work in the treatment, instead of advising rest. Second, special arrangements, such as gradual return to work, reduced workload or modified work, may facilitate the return to work of employees. Support from close relatives, attending physicians and colleagues and a supportive work environment contribute to the self-confidence of employees in returning to work. Third, attention must be paid to changing disability cognitions, particularly unreal beliefs and views about prolonged disability following infectious mononucleosis. It has recently been reported that patients with infectious mononucleosis who were advised to pursue activities in a psycho-educational intervention recovered faster than patients with restricted activity [15].

We conclude that in our study population, the duration until return to work following infectious mononucleosis exceeded the recommendations and the duration reported in a population of sportsmen [16,17]. General practitioners and occupational physicians should avoid advising rest, in order to prevent prolonged fatigue and failure to recover. If there are no complications, it is safe to start gradual return to work 4 weeks after the onset of infectious mononucleosis.

### Key points

- Little is known about the sickness absence and return to work of employees with Epstein–Barr virus infectious mononucleosis.
- Sickness absence due to infectious mononucleosis has a median duration of 91 days, whereas the acute phase of mononucleosis lasts for ~4 weeks.
- General practitioners and occupational physicians should avoid advising rest, in order to prevent physical deconditioning.

### Conflicts of interest

None declared.

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